

CLAIMS

1. A method for producing a xanthophyll from a photosynthetic microalga, comprising:
 - 5 a growth step of inoculating a photosynthetic microalga containing a xanthophyll into a nutrient medium to grow the photosynthetic microalga; and
 - an encystment step of encysting the grown microalga.
- 10 2. The method of claim 1, wherein the inoculated photosynthetic microalga containing the xanthophyll is an encysted photosynthetic microalga.
- 15 3. The method of claim 1 or 2, wherein the growth step and the encystment step are performed in a same culture tank.
4. The method of any one of claims 1 to 3, wherein the growth step and the encystment step are performed using a low nutrient medium.
- 20 5. The method of any one of claims 1 to 4, wherein the growth step and the encystment step are performed by batch culture.
6. The method of claim 1 or 2, wherein the growth step and the encystment step are performed independently using different media.
- 25 7. The method of claim 6, wherein the growth step and the encystment step are performed independently by batch culture.

8. The method of any one of claims 1 to 7, wherein the growth step and the encystment step are performed under light irradiation.
9. The method of any one of claims 1 to 8, wherein the microalga is a green alga belonging to the genus *Haematococcus*.
10. The method of any one of claims 1 to 9, wherein the green alga is *Haematococcus pluvialis*.
- 10 11. The method of any one of claims 1 to 10, wherein the xanthophyll is astaxanthin.
12. A photosynthetic microalga having a zoospore containing a xanthophyll.